

REMARKS/ARGUMENTS

Claims 1, 5, 7-8, 10-16 and 21-25 are active.

Claim 1 is amended to incorporate Claim 9 and to include the thickness of the barrier layer as described on page 5, lines 22-24 of the application as originally filed.

Claims 10 and 25 are amended for clarity.

As a result of these amendments and the cancellation of Claim 3, the rejections under 35 USC 112, first and second paragraphs are no longer applicable.

The specification is amended to include a section referencing earlier filed applications to which the present application claims benefit.

No new matter is added.

Applicants appreciate the indication on page 8, item 7 of the Official Action that Claim 12 is directed to allowable subject matter. In view of the amendments and discussion submitted in this paper, it is requested that all pending claims be similarly allowed.

The Examiner has maintained the rejections under 35 USC 102(b) based on Arbab (US 5,942,338) or under 35 USC 103(a) combining Arbab with Coustet.

As apparent, the claims require that

the barrier layer based on zirconium is situated above and in contact with the functional silver layer and the upper dielectric layer comprises at least one ZnO-based layer is situated above and in contact with the barrier layer;

that can be diagrammatically represented as *substrate . . . Ag/Zr/ZnO*
or

the barrier layer based on zirconium is situated beneath and in contact with the functional silver layer and the upper dielectric layer comprises at least one ZnO-based layer is situated above and in contact with the functional silver layer or an upper barrier layer based on nickel-chromium, titanium, or niobium

that can be diagrammatically represented as ***substrate . . .Zr/Ag/ZnO OR substrate. .
.Zr/Ag/NiCr, Ti, or Nb/ZnO***

wherein the barrier layer is from **0.6 to 2** nm

wherein said multilayer substantially retains its properties, after a heat treatment at a temperature of **at least 500°C**.

See amended Claim 1.

Arbarb describes a metallic reflective silver layer that can directly contact a zinc oxide layer (see col. 6, lines 50-53) and can include a primer layer composed of Zr, Ta, Nb, Ni, Cr, Cu, Al, Hf, mixtures, etc which is deposited over the substrate far side of the metallic layer (col. 7, lines 46-57) . Arbarb also describes an MDE layer deposited over the primer layer which can include an oxide of zinc and tin (see col. 8, lines 58-63).

Therefore, Arbarb suggests the possibility of Zr as an upper blocking layer in column 7, lines 46-50. However, in col. 7, lines 66 to col. 8, line 33, Arbarb also teaches that (emphasis added):

Where the coated article is not expected to be exposed to high temperature processing in an oxidizing atmosphere, the primer layer may be thin (e.g. 8 to 12 Angstroms). In the absence of high temperature processing, the thin primer layer will suffice to protect the metallic reflective layer from oxidizing during the deposition of the MDE layer thereover.

However, if the coated article is expected to be subjected to high temperature processing, e.g. tempering, a thicker (e.g. greater than 20 Angstroms) primer layer may be employed. This is so because heat treatment in an oxidizing environment generally accelerates oxidation and the thicker primer layer will be able to withstand the strongly oxidizing conditions of high temperature processing. See for example, U.S. Pat. No. 4,806,220, the disclosure of which is incorporated herein by reference. In the practice of the invention, it has been found that where the coated article will be exposed to heat treatment, there is a point at which the primer layer may be made either too thin or too thick. Too thin a primer layer, e.g. below about 20 Angstroms, results in a lack of protection for the reflective, metallic film from oxidation at high temperature thus rendering

the coated article unacceptable for heat treatment and in poor shear resistance which makes the article unsuitable for long distance shipment or additional thermal processing.

The fact that (A) one must select from a large number of variables to choose specific layers, (B) position them in the manner as claimed; and (C) define the thickness of the barrier layer in a range not exceeding 2 nm (20 Angstroms), cannot be sufficient disclosure for an anticipation rejection. Indeed, Arbarb, while suggesting a range of about 20 Angstroms (see col. 8, line 30) actually teaches that thicker layers are more preferred (see col. 8, lines 31-32).

Simply by Arbarb listing a plethora of putative materials that may or may not be included, and indeed, when Arbarb directs one further to other types of compositions and thicknesses different from those claimed, Arbarb's generic and meaningless disclosure does not put the composition defined in the present claims in the possession of the public. Arbarb simply has not arranged the elements of the claims as the law requires.

Thus, Arbarb does not describe the claimed composition with any specificity such that these limitations "are sufficiently limited or well delineated" to place the claimed composition in the possession of the public. See MPEP §2131.02 and *Ex parte A, Id.*

One may look to the preferred embodiments to determine which compositions can be anticipated. *In re Petering*, 301 F.2d 676, 133 USPQ 275 (CCPA 1962). The generic disclosure defined in Arbarb that the Examiner alleges embraces the claimed subject matter embraces a plethora of compositions and arrangements taking into consideration all the optional materials, combinations of materials and thicknesses (see just col. 7-8 of Arbarb as an example).

The breadth of the scope of articles embraced by Arbarb is important to the analysis of whether the artisan would envision any one specific, unnamed composition. In *In re Petering*, the prior art disclosed a generic chemical formula that possessed a generic class consisting of about 20 compounds. This decision represents the minimum threshold (one in

20) to hold that a reference “described” the claimed compound or composition such that one of ordinary skill in the art is able to “at once envisage” the compound or composition. As such, when the generic class consists of 20 or less the reference is generally taken to anticipate the claims. However, where the generic class exceeds 20, this should not apply to anticipation rejection.

Accordingly, the Arbarb disclosure does not anticipate the claims as presented in this paper.

Further, the Arbarb disclosure would not have rendered the present claims obvious. Indeed, Arbard merely suggests the possibility of Zr amongst other materials and combinations and alloys in col. 7 and Arbarb clearly has its most preferred thicknesses, when subject to high temperature processing, to exceed 20 Angstroms (2 nm) including 22 and 24 Angstroms (see again, col. 8, liens 31-32).

As noted in the specification on page 4, lines 13-16 the barrier layer composed of zirconium can be below or above the functional layer and as discussed in the specification on page 1, third paragraph, the basic arrangement of the claims was known but with other metals. Indeed, the specification on page 3, third paragraph, explains that the prior multi-layers had poor performance and were unsatisfactory. The specification provides a series of examples and comparative examples demonstrating the improved effect when zirconium is used as the barrier layer in conjunction with a ZnO based dielectric layer and a silver functional metal layer.

In particular, comparative Example 1 uses a nickel chromium barrier layer with the tin oxide dielectric layer where comparative Example 2 replaces the barrier layer with zirconium and as discussed on page 10 the replacement improves color retention, transmission and resistance. Example 1 employs a zirconium barrier and a ZnO dielectric layer with a final tin oxide layer, where Example 2 replaces that final tin oxide layer with a silicone nitride layer.

Comparative Examples 1a and 2a vary the thickness but are generally the same as comparative Examples 1 and comparative Example 2, which have the same effect in terms of light transmission and other properties (see page 13 of the application). Example 3 and comparative Example 3 (on pages 14-15 of the application) compare the zirconium barrier layer and nickel chromium and the table on page 15 (table 8) demonstrates better reflection and more adept at withstanding heat treatment.

The rejection of Claims 3-4 and 7 under 35 USC 103(a) combining Arbab and Chesworth is to allege that the lower barrier layer in claims 3-4 and thickness of silver layer in Claim 7 would have been obvious. However, for these dependent claims, as discussed in detail above in the rejections applied under 35 USC 102, the combination of art does not teach a transparent substrate with at least one functional layer, one metal barrier layer based on Zr and at least one upper dielectric layer where

- (A) a barrier layer based on Zr is above and in contact with the silver functional layer and a upper dielectric comprising ZnO is in contact with the barrier layer based on Zr that is diagrammatically represented as
Substrate . . /Ag/Zr/ZnO
- (B) a barrier layer based on Zr is below and in contact with the silver functional layer and an upper dielectric comprising ZnO above and in contact with the silver functional layer that can be diagrammatically represented as Substrate. . .Zr/Ag/ZnO; or
- (C) a barrier layer based on Zr is below and in contact with the silver functional layer and an upper dielectric comprising Ni-Cr, Ti or Nb above and in contact with the silver functional layer that can be diagrammatically represented as Substrate. . .Zr/Ag/ Ni-Cr, Ti or Nb.

The rejection of Claims 1, 3, 5-11, 13-16, and 18-25 under 35 USC 103(a) combining Arbab with Coustet is to allege that the positioning of the barrier layer based on Zr beneath and in contact with the functional silver layer would have been obvious.

The fact that (A) one must select from a large number of variables to choose specific layers from Arbab, (B) position them in the manner as claimed; and (C) define the thickness of the barrier layer in a range not exceeding 2 nm (20 Angstroms), cannot render the claims obvious particularly when Arbab, while suggesting a range of about 20 Angstroms (see col. 8, line 30) actually teaches that thicker layers are more preferred (see col. 8, lines 31-32). Coustet would not have been used by one skilled in the art to modify the explicit direction that Arbab teaches regarding the thickness of the primer layer.

Reconsideration and Withdrawal of all rejections is requested.

A Notice of Allowance is requested.

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